What is claimed is:

1. An excimer or molecular fluorine laser, comprising:

a discharge chamber filled with a gas mixture including molecular fluorine;

a plurality of electrodes within the discharge chamber connected to a pulsed discharge circuit for energizing the gas mixture; and

a resonator for generating a laser beam including a pair of resonator reflector surfaces, the discharge chamber and a line-narrowing module,

wherein the line-narrowing module includes:

a beam expander including one or more optical elements for expanding the beam and reducing a divergence of the beam; and

a reflection grating coupled with a heat sink, said grating for receiving the expanded beam and dispersing the beam to reduce a bandwidth of the beam that remains within an acceptance angle of the resonator upon dispersion by the grating, said heat sink for removing heat caused by beam absorption.

2. The laser of Claim 1, further comprising one or more interferometric devices for further improving a spectral purity of the beam.

3. The laser of Claim 2, wherein at least one of the one or more interferometric devices is rotatable for tuning the wavelength output by the line-narrowing module.

4. The laser of Claim 1, wherein the beam expander includes one or more prisms.

5. The laser of Claim 4, wherein at least one of the one or more prisms is rotatable for tuning the wavelength output by the line-narrowing module.

6. The laser of Claim 4, wherein at least two of the prisms are synchronously rotatable for tuning the wavelength output by the line narrowing module, and for mutually compensating a re-directing of the beam path produced by rotation of said prisms.

7. The laser of Claim 1, further comprising a sealed enclosure around one or more optical elements of the line-narrowing module and a processor for monitoring the wavelength of the beam, and wherein the sealed enclosure includes an inert gas inlet for filling the enclosure with an inert gas, the processor further for controlling the pressure of the inert gas within the enclosure for tuning the wavelength output by the line-narrowing module.

8. The laser of Claim 7, wherein the enclosure further includes an outlet for flowing an inert gas through said enclosure.

9. The laser of any of Claims 7 or 8, wherein the grating is within the enclosure.

10. The laser of Claim 9, wherein the beam expander includes one or more elements disposed within the enclosure.

11. The laser of Claim 9, wherein the line-narrowing module further includes one or more interferometric devices.

12. The laser of claim 11, wherein at least one of the one or more interferometric devices is within the enclosure.

13. The laser of any of Claims 7 or 8, wherein the line-narrowing module further includes one or more interferometric devices within the enclosure.

14. The laser of any of Claims 7 or 8, wherein the line-narrowing module further includes one or more elements of the beam expander within the enclosure.

15. An excimer or molecular fluorine laser, comprising:

a discharge chamber filled with a gas mixture including molecular fluorine;

a plurality of electrodes within the discharge chamber connected to a pulsed discharge circuit for energizing the gas mixture; and

a resonator for generating a laser beam including a pair of resonator reflector surfaces, the discharge chamber and a line-narrowing module

including one or more optical elements for reducing the bandwidth of the beam,

a sealed enclosure around one or more optical elements of the line-narrowing module; and

a processor for monitoring the wavelength of the beam, and wherein the sealed enclosure includes an inert gas inlet for filling the enclosure with an inert gas, the processor further for controlling the pressure of the inert gas within the enclosure for tuning the wavelength output by the line-narrowing module.

16. The laser of Claim 15, wherein the enclosure further includes an outlet for flowing an inert gas through said enclosure.

17. The laser of any of Claims 15 or 16, wherein the line-narrowing module includes:

a beam expander including one or more optical elements for expanding the beam and reducing a divergence of the beam; and

a reflection grating for receiving the expanded beam and dispersing the beam to reduce a bandwidth of the beam that remains within an acceptance angle of the resonator upon dispersion by the grating.

18. The laser of Claim 17, wherein the grating is within the enclosure.

19. The laser of Claim 18, wherein at least one of the one or more optical elements of the beam expander is also within the enclosure.

20. The laser of Claim 18, wherein the line-narrowing module further includes one or more interferometric devices within the enclosure.

21. The laser of Claim 17, wherein the line-narrowing module further includes one or more interferometric devices within the enclosure.

22. The laser of Claim 16, wherein the processor controls the pressure within the enclosure by controlling a rate of flow of said inert gas.

23. The laser of any of Claims 1, 15 or 16, further comprising an output coupling interferometer including at least one curved inner surface such a gap spacing between said curved surface and an opposing inner surface varies over a cross section of the interferoemter for further improving a spectral purity of the beam.

24. The laser of Claim 23, wherein said opposing inner surface is a substantially flat surface.

25. The laser of Claim 23, wherein said opposing inner surface is curved surface, wherein said two inner surfaces having opposing curvatures.

26. The laser of Claim 23, wherein said laser is an ArF laser emitting at a wavelength of 193 nm.

26. The laser of any of Claims 1, 15 or 16, further comprising an etalon output coupler for further improving a spectral purity of the beam.

27. The laser of any of Claims 1, 15 or 16, wherein the laser is a molecular fluorine laser emitting around 157 nm.

28. The laser of any of Claims 1, 15 or 16, wherein the laser is an ArF laser emitting around 193 nm.

29. The laser of any of Claims 1, 15 or 16, wherein the laser is a KrF laser emitting around 248 nm.

30. The laser of Claim 1, wherein the line-narrowing module further includes an interferometric device disposed in front of the grating after the beam expander.

31. The laser of Claim 17, wherein the line-narrowing module further includes an interferometric device disposed in front of the grating after the beam expander.

32. An excimer of molecular fluorine laser, comprising:

a discharge chamber filled with a gas mixture including molecular fluorine and a buffer gas;

a plurality of electrodes within the discharge chamber connected to a pulsed discharge circuit for energizing the gas mixture at a repetition rate of more than 2 kHz; and

a resonator for generating a laser beam including a pair of resonator reflector surfaces, the discharge chamber and a line-narrowing module including a beam expander, an interferometric device and a grating for reducing the bandwidth of the beam to less than 0.5 pm,

wherein the beam expander comprises optics formed of a thermally stable material at DUV wavelengths and below and at said repetition rate of more than 2 kHz, said interferometric device comprises a pair of plates formed of said same thermally stable material, and the grating is thermally and mechanically stabilized within the line-narrowing module.

33. The laser of Claim 32, wherein said thermally stable material of said optics of said beam expander and of said plates of said interferometric device is selected from the group of materials consisting of CaF_2, MgF_2, LiF and BaF_2.

34. The laser of Claim 32, wherein said thermally stable material of said optics of said beam expander and of said plates of said interferometric device is CaF_2.

35. The laser of Claim 32, wherein said thermally stable material of said optics of said beam expander and of said plates of said interferometric device is MgF_2.

36. An excimer or molecular fluorine laser, comprising:

a discharge chamber filled with a gas mixture including molecular fluorine;

a plurality of electrodes within the discharge chamber connected to a pulsed discharge circuit for energizing the gas mixture; and

a resonator for generating a laser beam including a pair of resonator reflector surfaces, the discharge chamber and a line-narrowing module including a beam expander, an interferometric device and a grating for reducing the bandwidth of the beam,

wherein the interferometric device is disposed before the grating after the beam expander.

37. The laser of Claim 36, wherein the beam expander includes a plurality of prisms each disposed between the interferometric device and the discharge chamber.

38. The laser of Claim 36, wherein the beam expander includes at least three prisms each disposed between the interferometric device and the discharge chamber.

39. The laser of any of Claims 34-36, wherein the laser is a KrF laser emitting around 248 nm.

40. An excimer or molecular fluorine laser, comprising:

a discharge chamber filled with a gas mixture including molecular fluorine;

a plurality of electrodes within the discharge chamber connected to a pulsed discharge circuit for energizing the gas mixture;

a resonator for generating a laser beam including a pair of resonator reflector surfaces, the discharge chamber and a line-narrowing module;

a sealed enclosure around one or more optical elements of the line-narrowing module; and

a processor for monitoring the wavelength of the beam, and wherein the sealed enclosure includes an inert gas inlet for filling the enclosure with an inert gas, the processor further for controlling the pressure of the inert gas within the enclosure for tuning the wavelength output by the line-narrowing module,

wherein the line-narrowing module includes:

a beam expander including one or more optical elements for expanding the beam and reducing a divergence of the beam; and

a reflection grating coupled with a heat sink, said grating for receiving the expanded beam and dispersing the beam to reduce a bandwidth of the beam that remains within an acceptance angle of the

resonator upon dispersion by the grating, said heat sink for removing heat caused by beam absorption.

41. The laser of Claim 40, wherein the enclosure further includes an outlet for flowing an inert gas through said enclosure.

42. The laser of any of Claims 1 or 37, wherein said grating is fixable attached to said heat sink.